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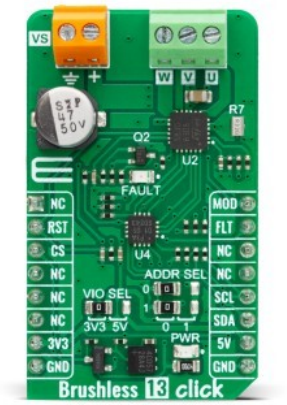
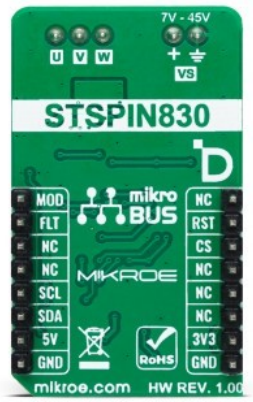
Brushless 13 Click





PID: MIKROE-5886

Brushless 13 Click is a compact add-on board that controls brushless DC motors with any MCU. This board features the STSPIN830, a compact and versatile three-phase and three-sense motor driver from STMicroelectronics. The driver integrates both the control logic and a fully protected low RDson triple half-bridge power stage. On this Click board™, the single-shunt architecture is enabled, and the driver embeds a PWM current limiter based on user-settable values of reference voltage and OFF time. This Click board™ makes the perfect solution for the development of industrial robotics, medical and health care, factory automation end-points, home appliances, small pumps, and more.

Brushless 13 Click is fully compatible with the mikroBUS™ socket and can be used on any host system supporting the mikroBUS™ standard. It comes with the mikroSDK open-source libraries, offering unparalleled flexibility for evaluation and customization. What sets this Click board™ apart is the groundbreaking ClickID feature, enabling your host system to seamlessly and automatically detect and identify this add-on board.

How does it work?

Brushless 13 Click is based on the STSPIN830, a compact and versatile three-phase and three-sense motor driver from STMicroelectronics. The driver features the dedicated mode input, thus allowing you to decide whether to drive it through six inputs, one for each power switch or a more common three PWM direct driving inputs. The driver integrates a complete set of protections for the power stages, such as non-dissipative overcurrent, thermal shutdown, short-circuit, under-voltage lockout, and interlocking. Considering a low standby current consumption, it makes an ideal and bulletproof solution for the new wave of demanding industrial applications.

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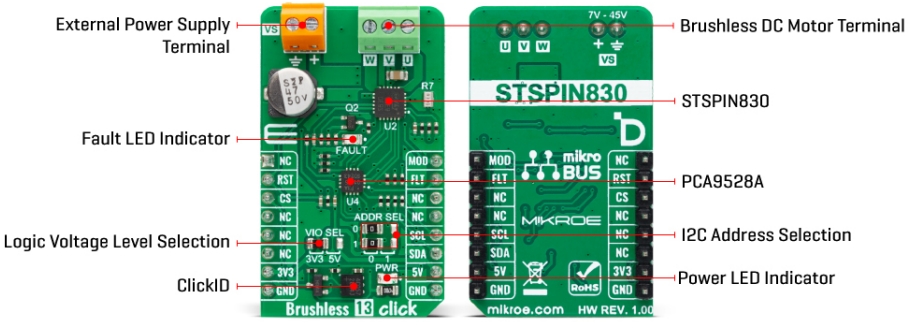

To control all high and low side driver control inputs of the STSPIN830, Brushless 13 Click features the PCA9538A, a low-voltage 8-bit I2C I/O port with interrupt and reset from NXP. Besides driver control inputs, this I/O port also controls the enable input of the motor driver. The BLDC motor can be connected over the screw terminal, labeled U, V, and W. Additional screw terminal is just aside for connecting an external power supply in a range of 7V up to 45V.

Brushless 13 Click uses a standard 2-wire I2C interface of the PCA9538A to communicate with the host MCU, supporting clock frequencies up to 400kHz. The I2C address of the PCA9538A can be set over the ADDR SEL jumpers, with the 0 position selected by default. If a fault condition occurs, the STSPIN830 will pull the FLT pin to a low logic state, along with the FAULT LED. The RST pin resets the STSPIN830 motor driver. The driver's mode can be set over the MOD pin, with a HIGH logic state for three PWM direct drive inputs. The LOW logic state will allow a driver to drive the motor through six inputs.

This Click board™ can operate with either 3.3V or 5V logic voltage levels selected via the VCC SEL jumper. This way, both 3.3V and 5V capable MCUs can use the communication lines properly. Also, this Click board™ comes equipped with a library containing easy-to-use functions and an example code that can be used as a reference for further development.

Specifications

Type	Brushless
Applications	Can be used for the development of industrial robotics, medical and health care, factory automation end-points, home appliances, small pumps, and more
On-board modules	STSPIN830 - compact and versatile three-phase and three-sense motor driver from STMicroelectronics
Key Features	Three-phase BLDC motor driver, current control with adjustable OOF time, flexible driving methodology between 6 inputs (high side & low side driving) and 3 inputs (direct PWM driving), low standby current consumption, non-dissipative overcurrent protection, short-circuit protection, under-

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	voltage lockout, thermal shutdown, interlocking function, and more
Interface	I2C
Feature	ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V or 5V,External

Pinout diagram

This table shows how the pinout on Brushless 13 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS™				Pin	Notes
	NC	1	AN	PWM	16	**MOD**	Mode Control
Reset	**RST**	2	RST	INT	15	**FLT**	Fault Interrupt
ID COMM	**CS**	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	**SCL**	I2C Clock
	NC	6	MOSI	SDA	11	**SDA**	I2C Data
Power Supply	**3.3V**	7	3.3V	5V	10	**5V**	Power Supply
Ground	**GND**	8	GND	GND	9	**GND**	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
LD2	FAULT	-	Fault LED Indicator
JP1	VIO SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V
JP2-JP3	ADDR SEL	Left	I2C Address Selection 0/1: Left position 0, Right position 1

Brushless 13 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
External Power Supply Voltage	7	-	45	V
Maximum Output Current	-	-	1.5	A

Software Support

We provide a library for the Brushless 13 Click as well as a demo application (example), developed using MIKROE compilers. The demo can run on all the main MIKROE development boards.

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Package can be downloaded/installed directly from NECTO Studio Package Manager (recommended), downloaded from our LibStock™ or found on Mikroe github account.

Library Description

This library contains API for Brushless 13 Click driver.

Key functions

- brushless13_set_mode Brushless 13 set mode pin function.
- brushless13_get_flt_pin Brushless 13 get fault pin function.
- brushless13_drive_motor Brushless 13 drive motor function.

Example Description

This example demonstrates the use of the Brushless 13 Click board™ by driving the motor in both directions at different speeds.

The full application code, and ready to use projects can be installed directly from NECTO Studio Package Manager (recommended), downloaded from our LibStock™ or found on Mikroe github account.

Other Mikroe Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.Brushless13

Additional notes and informations

Depending on the development board you are using, you may need USB UART click, USB UART 2 Click or RS232 Click to connect to your PC, for development systems with no UART to USB interface available on the board. UART terminal is available in all MIKROE compilers.

mikroSDK

This Click board™ is supported with mikroSDK - MIKROE Software Development Kit. To ensure proper operation of mikroSDK compliant Click board™ demo applications, mikroSDK should be downloaded from the LibStock and installed for the compiler you are using.

For more information about mikroSDK, visit the official page.

Resources

mikroBUS™

mikroSDK

Click board™ Catalog

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Click Boards™

ClickID

Downloads

Brushless 13 click example on Libstock

Brushless 13 click schematic

STSPIN830 datasheet

PCA9538A datasheet

Brushless 13 click 2D and 3D files